

What is claimed is:

1. A method for writing a track specific servo sector to a disc surface of a disc drive comprising steps of:

- 5 (a) connecting the disc drive to a position information writing apparatus for writing the track specific servo sector to the disc surface;
- (b) positioning a read/write head of the disc drive in relation to a first portion of the disc surface with a position signal of the position information writing apparatus while writing a first track specific servo sector on the first portion of the disc surface using a write element of the read/write head; and
- 10 (c) reading the first track specific servo sector of the first portion with a read element of the read/write head to produce a head position control signal, and combining the head position control signal with the position signal of the position information writing apparatus to position the write element in relation to a second portion of the disc surface while writing a second track specific servo sector on the second portion of the disc surface.

2. The method of claim 1 in which the connecting step (a) comprises

20 steps of:

- (a1) connecting a connector of an actuator assembly of the disc drive to the position information writing apparatus for communication between the disc drive and the position information writing apparatus during writing of the track specific servo sector to the disc surface of the disc
- 25 drive;
- (a2) attaching a first end of a push-pin to the actuator assembly and a second end of the push-pin to a positioner of the position information writing apparatus, the push-pin providing a mechanical link between the actuator assembly and the positioner during writing of the track
- 30 specific servo sector; and

- (a3) applying power to the position information writing apparatus to initiate writing of the track specific servo sector to the disc surface of the disc drive.

5           3.     The method of claim 1 in which the first portion of the disc surface of positioning step (b) comprises a plurality of data tracks wherein each data track comprises a plurality of head position control fields, and in which the positioning step (b) comprises steps of:

- 10           (b1) measuring offset of the write element in relation to the read element for use in determining a number of data tracks corresponding to the plurality of data tracks comprising the first portion of the disc surface;
- 15           (b2) holding the write element in a fixed position in relation to the position information writing apparatus while writing the head position control field on the disc surface therein forming a first data track of the plurality of data tracks of the first portion of the disc surface;
- 20           (b3) moving the write element to a second position adjacent the first data track of the first portion for formation of a second data track of the plurality of data tracks of the first portion, the second position based on the measured offset of the write element in relation to the read element;
- 25           (b4) maintaining the write element in a fixed position in relation to the first data track of the first portion while writing the head position control field on the disc surface therein forming the second data track of the plurality of data tracks of the first portion of the data surface; and
- (b5) repeating steps (b3) and (b4) until all head position control fields for each data track of the plurality of data tracks comprising the first portion of the disc surface have been written to the disc surface.

30           4.     The method of claim 1 in which the first portion of the disc surface of the positioning step (b) portion of the disc surface determination comprises steps of:

(bi) measuring an offset of the write element in relation to the read element for use in determining a number of adjacent data tracks comprising the first portion of the disc surface;

(bii) determining the number of adjacent data tracks representing the measured offset of the read element and the write element; and

(biii) controlling position of the write element in relation to the first portion of the disc surface using the position information writing apparatus while writing disc level servo information on each of the adjacent data tracks of the first portion such that when the read element is position-controlled on the first data track of the first portion the write element is position-controlled on a first data track of a second portion of the disc surface.

5. The method of claim 3 in which the plurality of data tracks comprise a number of adjacent data tracks and in which moving step (b3) further comprises steps of:

(b3a) determining the number of adjacent data tracks comprising the first portion of the disc surface; and

(b3b) writing each of the plurality of the head position control field on each of the number of adjacent data tracks of the first portion such that when the read element of the read/write head is position-controlled on a first adjacent data track of the first portion of the disc surface, the write element of the read/write head is position-controlled on a first data track of the second portion of the disc surface.

6. The method of claim 1 in which the first portion of the disc surface of positioning step (b) comprises a plurality of data tracks, each data track providing a plurality of track specific servo sectors having a head position control field, and in which the reading step (c) comprises steps of:

(c1) reading the head position control field of a selected track specific servo sector of the plurality of track specific servo sectors of a selected data

track of the plurality of data tracks of the first portion of the disc surface to position-control the read/write head relative to the first portion of the disc surface using the position information writing apparatus;

- 5 (c2) transducing a position error signal from the position control field for use in determining position correction of the read element of the read/write head in relation to the selected data track;
- 10 (c3) isolating a disturbance acting on the disc surface and determining a level of the head position control signal commensurate with the position correction of the read element in relation to the position information writing apparatus to apply to compensate effects of the isolated disturbance; and
- 15 (c4) recording the level of the head position control signal for use in compensating the write element position in relation to the position information writing apparatus while writing a head position control field on the second portion of the disc surface.

7. The method of claim 6 in which the writing portion of reading step

(c) further comprises steps of:

- 20 (c5) reading the head position control field of the selected data track of the first portion and the recorded head position control signal, for use in correcting the position of the write element in relation to the second portion of the disc surface;
- 25 (c6) combining the head position control signal with the position signal of the position information writing apparatus to position-control the write element in relation to the position information writing apparatus; and
- 30 (c7) writing the head position control field of the second portion radially offset from the head position control field of the selected track specific servo sector of the plurality of track specific servo sectors of the selected data track of the plurality of data tracks of the first

portion of the disc surface by an amount substantially equaling a spacing separating the read element of the read/write head from the write element of the read/write head.

- 5           8.     The method of claim 1 in which the position information writing apparatus of connecting step (a) is the servo track writer and the produced head position control signal of reading step (c) compensates effects of selective frequencies present during writing of the first track specific servo sector.
- 10           9.     The method of claim 1 in which the second track specific servo sector of the second portion of reading step (c) is written in substantially radial alignment with the first track specific servo sector of the first portion of writing step (c).
- 15           10.    The method of claim 3 in which the write element of measuring step (b1) is an inductive element and the read element of measuring step (b1) is a magneto-resistive element.
- 20           11.    The method of claim 7 in which the head position control field of the second portion of writing step (c7) is a head position control field of a selected track specific servo sector of a plurality of track specific servo sectors of a selected data track of a plurality of data tracks of the second portion of the disc surface written substantially circumferentially aligned to the head position control field of the first portion of writing step (c7).
- 25           12.    The method of claim 7 in which the head position control field of the second portion of writing step (c7) is a head position control field of a selected track specific servo sector of a plurality of track specific servo sectors of a selected data track of a plurality of data tracks of the second portion of the disc surface written substantially radially aligned to the head position control field of the head position
- 30           information of the first portion of writing step (c7).

13. A disc drive comprising:  
a basedeck supporting a spindle motor assembly;  
a rotatable disc surface having an outer diameter and an inner diameter  
attached to the spindle motor assembly, the disc surface for data  
storage;  
an actuator assembly supported by the basedeck and having a read/write head  
rotationally positionable adjacent the disc surface, the read/write head  
comprising a read element for reading data from the disc surface and  
a write element offset from the read element in one direction across  
the disc surface from the outer diameter to the inner diameter for  
writing data to the disc surface; and  
a first head position control field stored on a first portion of the disc surface  
for correcting position of the read element in relation to the first  
portion and the write element in relation to a second portion of the  
disc surface while the write element writes a second head position  
control field to the second portion offset from the first head position  
control field of the first portion a distance substantially the same as  
the offset of the write element from the read element by steps for  
writing the second head position control field to the disc surface.

14. The disc drive of claim 13 in which the read element is separated  
from the write element by a predetermined spacing, and wherein the read element is  
substantially radially aligned and substantially circumferentially aligned to the write  
element.

15. The disc drive of claim 13 in which the first head position control  
field of the first portion having a geometric shape provides position correction  
information for position-control of the read element in relation to the first portion  
while the write element writes the second head position control field to the second  
portion in conformance with the geometric shape of the first head position control  
field of the first portion.

16. The disc drive of claim 13 in which the first portion of the disc surface comprises a data track and the head position control field of the first portion comprises an "A" burst adjacent a "B" burst.

5 17. The disc drive of claim 16 in which the second portion of the disc surface comprises a data track and the head position control field of the second portion comprises an "A" burst adjacent a "B" burst.

10 18. The disc drive claim 16 in which the head position control field of the first portion and the head position control field of the second portion are offset, substantially radially aligned and substantially circumferentially aligned one to the other wherein the offset is substantially the same as the offset of the read element from the write element of the read/write head.

15 19. The disc drive of claim 13 in which the write element of the read/write head is an inductive element and the read element of the read/write head is a magneto resistive element.

20 20. The disc drive of claim 13 in which the steps for writing the second head position control field to the disc surface comprises steps of:

- (a) connecting the disc drive to a position information writing apparatus for writing the first head position control field to the disc surface;
- (b) positioning the read/write head of the disc drive in relation to the first portion of the disc surface with a position signal of the position information writing apparatus while writing the first head position control field on the first portion of the disc surface using the write element of the read/write head; and
- (c) reading the first head position control field of the first portion with the read element of the read/write head to produce a head position control signal, and combining the head position control signal with the position signal of the position information writing apparatus to

position-control the write element in relation to the second portion of the disc surface while writing the second head position control field on the second portion of the disc surface.

5           21.    The disc drive of claim 20 in which the connecting step (a) comprises steps of:

- 10                   (a1) connecting a connector of the actuator assembly of the disc drive to the position information writing apparatus for communication between the disc drive and the position information writing apparatus during writing of the first head position control field to the disc surface of the disc drive;
- 15                   (a2) attaching a first end of a push-pin to the actuator assembly and a second end of the push-pin to a positioner of the position information writing apparatus, the push-pin providing a mechanical link between the actuator assembly and the positioner during writing of the first head position control field; and
- 20                   (a3) applying power to the position information writing apparatus to initiate writing of the first head position control field to the disc surface of the disc drive.

22.    The disc drive of claim 20 in which the first portion of the disc surface comprises a plurality of data tracks wherein each data track comprises a plurality of the head position control field, and in which the positioning step (b) comprises steps of:

- 25                   (b1) measuring the offset of the write element in relation to the read element for use in determining a number of data tracks corresponding to a plurality of data tracks comprising the first portion of the disc surface;
- 30                   (b2) holding the write element in a fixed position in relation to the position information writing apparatus while writing the first head position



control field on the disc surface therein forming a first data track of the plurality of data tracks of the first portion of the disc surface;

(b3) moving the write element to a second position adjacent the first data track of the first portion for formation of a second data track of the plurality of data tracks of the first portion, the second position based on the measured offset of the write element in relation to the read element;

(b4) maintaining the write element in a fixed position in relation to the first data track of the first portion while writing the second head position control field on the disc surface therein forming the second data track of the plurality of data tracks of the first portion of the data surface; and

(b5) repeating steps (b3) and (b4) until all head position control fields for each data track of the plurality of data tracks comprising of the first portion of the disc surface have been written to the disc surface.

23. The disc drive of claim 20 in which the first portion comprises a plurality of adjacent data tracks and in which a portion determination of the disc surface utilized by the first portion of the disc surface comprises steps of:

(bi) measuring the offset of the write element in relation to the read element for use in determining a number of adjacent data tracks comprising the first portion of the disc surface;

(bii) determining the number of adjacent data tracks representing the measured offset of the read element and the write element; and

(biii) controlling position of the write element in relation to the first portion of the disc surface using the position information writing apparatus while writing disc level servo information on each of the adjacent data tracks of the first portion such that when the read element is position-controlled on the first data track of the first portion the write element is position-controlled on a first data track of a second portion of the disc surface.

24. The disc drive of claim 22 in which the plurality of data tracks comprise a number of adjacent data tracks and in which moving step (b3) further comprises steps of:

- 5 (b3a) determining the number of adjacent data tracks comprising the first portion of the disc surface; and
- 10 (b3b) writing each of the plurality of the head position control field on each of the number of adjacent data tracks of the first portion such that when the read element of the read/write head is position-controlled on a first adjacent data track of the first portion of the disc surface, the write element of the read/write head is position-controlled on a first data track of the second portion of the disc surface.

25. The disc drive of claim 20 in which the first portion of the disc surface comprises a plurality of data tracks, each data track providing a plurality of track specific servo sectors having a head position control field, and in which the reading step (c) comprises steps of:

- 15 (c1) reading the head position control field of a selected track specific servo sector of the plurality of track specific servo sectors of a selected data track of the plurality of data tracks of the first portion of the disc surface to position-control the read/write head relative to the first portion of the disc surface using the position information writing apparatus;
- 20 (c2) transducing a position error signal from the position control field for use in determining position correction of the read element of the read/write head in relation to the selected data track;
- 25 (c3) isolating a disturbance acting on the disc surface and determining a level of the head position control signal commensurate with the position correction of the read element in relation to the position information writing apparatus to apply to compensate effects of the isolated disturbance; and
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- (c4) recording the level of the head position control signal for use in compensating the write element position in relation to the position information writing apparatus while writing a head position control field on the second portion of the disc surface.

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26. The disc drive of claim 25 in which the writing portion of reading step (c) further comprises steps of:

- (c5) reading the head position control field of the selected data track of the first portion and the recorded head position control signal, for use in correcting the position of the write element in relation to the second portion of the disc surface;

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- (c6) combining the head position control signal with the position signal of the position information writing apparatus to position-control the write element in relation to the position information writing apparatus; and

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- (c7) writing the head position control field of the second portion radially offset from the head position control field of the selected track specific servo sector of the plurality of track specific servo sectors of the selected data track of the plurality of data tracks of the first portion of the disc surface by an amount substantially equaling a spacing separating the read element of the read/write head from the write element of the read/write head.

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27. The disc drive of claim 20 in which the position information writing apparatus of connecting step (a) is the servo track writer and the produced head position control signal of reading step (c) compensates effects of selective frequencies present during writing of the first head position control information.

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28. The disc drive of claim 26 in which the second portion of the disc surface comprises a plurality of data tracks, each data track providing a plurality of track specific servo sectors having a head position control field and in which the

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head position control field of the second portion of writing step (c7) is the head position control field of a selected track specific servo sector of the plurality of track specific servo sectors of a selected data track of the plurality of data tracks of the second portion of the disc surface written substantially circumferentially aligned to the head position control field of the first portion of writing step (c7).

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29. The disc drive of claim 26 in which the second portion of the disc surface comprises a plurality of data tracks, each data track providing a plurality of track specific servo sectors having a head position control field and in which the head position control field of the second portion of writing step (c7) is the head position control field of a selected track specific servo sector of the plurality of track specific servo sectors of a selected data track of the plurality of data tracks of the second portion of the disc surface written substantially radially aligned to the head position control field of the head position information of the first portion of writing step (c7).

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30. An apparatus made by steps comprising:  
reading head position control information from a first portion of a rotatable  
disc surface with a read element of a read/write head to produce a  
head position control signal; and

- 5 a step for combining the head position control signal with a position signal of  
to position-control the read element of the read write/head relative to  
the first portion while writing head position control information on a  
second portion of the disc surface with a write element of the  
read/write head.